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CaPReCon

Cartilage protection and regeneration consortium

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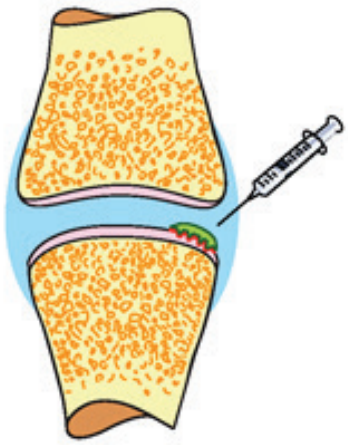

This proposal regroups 4 partners with complementary expertise in molecular biology, biomedical/chemical engineering, physics and clinical research to tackle an unmet clinical need: the treatment of osteoarthritic (OA) joints. OA is expected to become the fourth most important cause of disability worldwide by 2020. Yet, the existing treatments for OA suffer from major drawbacks: a limited efficacy (short therapeutic half-life, rapid lymph drainage) and adverse effects (inflammation and matrix degradation caused by acidic decomposition of drug products). There is an undeniable and urgent need to design more efficient drug delivery platforms, and to test novel therapeutic approaches. Our project is based on a unique technological platform, using lubricating and bioadhesive hybrid hydrogels to deliver, within a single injection, multiple drugs into the joint cavity, to stimulate cartilage regeneration while stopping mechanical abrasion and inflammation.
Our research program covers the development of:

1) a spectroscopy-guided delivery tool for the local administration of bioadhesive and medicated hydrogels;

2) an injectable hybrid hydrogel for the long-term delivery of biologic and synthetic active compounds to the joints;

3) and overall a novel therapeutic approach focused on the re-engineering of inflamed chondrocyte phenotype and restoration of the extracellular matrix production and quality.
The data gathered during this multinational project will provide an opportunity to generate new diagnostic/administration technologies to rapidly test novel combinations of drugs and to provide innovative treatments based on phenotype re-engineering. The modularity of the proposed technological platform will greatly accelerate the translation of the developed technologies towards pre-clinical validation and could become the first integrated solution for preventive and curative treatment of OA.